

Device for extending bones

The present invention relates to a device for extending bones, with two elements that can be moved in relation to one another and that are interconnected via at least one drive element.

Devices of this kind are known and commonly available on the market in a wide variety of formats and designs. They are used in particular for distraction of bones. They can be inserted into a bone cavity or a medullary space of a bone, and distraction can take place after the bone has been cut through.

A disadvantage of conventional devices is that they do not have high distraction forces and are technically very complex and expensive to manufacture, and, in addition, are to be produced in a limited size. For this reason, the possible applications are very limited, particularly in bones of short length and small diameter.

An additional disadvantage is that conventional distraction devices have a short travel and, after the complete travel has been exhausted, other distraction devices or appliances have to be fitted, which is also undesirable.

WO 98/30163 A discloses a distraction device for moving apart two bone sections, where two slidably mounted

cylindrical sleeves arranged coaxially one inside the other can be moved apart by means of a planetary roller system.

US 5,601,551 discloses a distraction device in which a number of components are arranged such that they can be individually moved to and fro on a rigid bar, the distraction device engaging on the outside of a bone.

The object of the present invention is to make available a device of the type mentioned in the introduction which overcomes the stated disadvantages and with which a device is made available that permits high distraction forces and provides a very long travel.

In addition, a device of this kind is to be able to be produced in all possible sizes so that it can be fitted in any desired spaces. In addition, energy and data transmission, and activation, must be able to take place in an unproblematic and contactless manner.

This object is achieved by the fact that, when the two elements are moved axially in relation to one another, they are guided in a manner secure against relative radial torsion, an inner cross section of the element in the area between an electric motor and planetary roller system has a polygonal, rectangular, many-cornered configuration as guide area for the second element, and an outer cross section of the element at least partially corresponds to the inner cross section of the first element in the guide area and has a polygonal, rectangular or many-cornered configuration.

In the present invention, it has proven particularly advantageous that the second element is fitted into the first element in such a way that it is secured against radial torsion relative to said first element. The securing against torsion can be obtained in different ways. For example, an outer contour or outer cross section of the second element can have a polygonal configuration, while a correspondingly configured guide element with correspondingly configured inner cross section of the second element in the end area ensures securing against radial torsion. This makes it possible, inside the second element, to ensure a distraction, in particular an axial movement of the second element in relation to the first element, by means of a planetary roller system or thread or spindle system or the like, by way of the drive element. This distraction, as a function of the gear